GROUP 12

ENGINE LUBRICATION

CONTENTS

GENERAL INFORMATION

M1121000100584

The lubrication method is a fully force-fed, full-flow filtration type. The oil pump is a gear type which is driven by the crankshaft via the timing belt.

ENGINE OILS

HEALTH WARNING

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

RECOMMENDED PRECAUTIONS

The most effective precaution is to adapt working practices which prevent, as far as practicable, the risk of skin contact with mineral oils, for example by using enclosed systems for handling used engine oil and by degreasing components, where practicable, before handling them. Other precautions:

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Avoid contaminating clothes, particularly underpants, with oil.
- Do not put oily rags in pockets, the use of overalls without pockets will avoid this.
- Do not wear heavily soiled clothing and oil-impregnated foot-wear. Overalls must be cleaned regularly and kept separate from personal clothing.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.
- Obtain first aid treatment immediately for open cuts and wounds.
- Wash regularly with soap and water to ensure all oil is removed, especially before meals (skin cleansers and nail brushes will help). After cleaning, the application of preparations containing lanolin to replace the natural skin oils is advised.
- Do not use petrol, kerosine, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin after work.
- If skin disorders develop, obtain medical advice without delay.

SERVICE SPECIFICATION

M1121000300425

Item		Standard value
Oil pressure kPa	at idle	29 or more
	at 3,500 r/min	294 – 686

LUBRICANTS

M1121000401094

Item			Specification
Engine oil ACEA classification			A1/B1, A3/B3, A3/B4 or A5/B5
Engine oil API classification			SG or higher
Engine oil quantity L	4A9	Oil filter	0.2
		Total	4.2
	4G1	Oil filter	0.3
		Oil cooler	0.1
		Total	3.7

SEALANTS

M1121000500463

Item		Specified sealant	Remark
Oil pressure switch	4A9	LOCTITE 565 or equivalent	Semi-drying sealant
	4G1	3M ATD Part No. 8660 or equivalent	

ON-VEHICLE SERVICE

ENGINE OIL CHECK

M1121000900546

1. Pull out the level gauge slowly and check that the oil level is in the illustrated range.
2. Check that the oil is not excessively dirty, that there is no coolant or petrol mixed in, and that it has sufficient viscosity.

ENGINE OIL REPLACEMENT <4A9>

M1121001001163

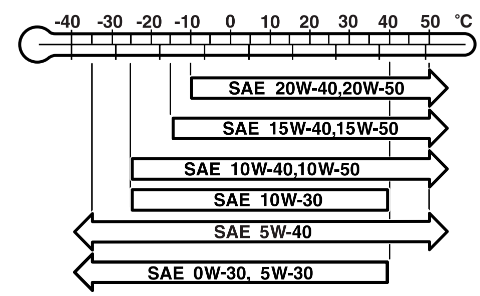
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.

⚠ *WARNING*

Use care as engine oil could be hot.

2. Remove the engine oil filler cap.
3. Remove the engine oil pan drain plug to drain engine oil.
4. Install a new engine oil pan drain plug gasket and then tighten the engine oil pan drain plug to the specified torque.

   Tightening torque: 39 ± 5 N·m



AC311073AB

5. Refill with specified quantity of engine oil.

   Specified engine oil (ACEA classification): A1/B1, A3/B3, A3/B4 or A5/B5

   Specified engine oil (API classification): SG or higher

   Total quantity (Includes volume inside engine oil filter): 4.2 L

   NOTE: SAE 0W-30, 5W-30, and 5W-40 engine oils can only be used if they meet ACEA A3/B3, A3/B4 or A5/B5 and API SG (or higher) specification.

6. Install the engine oil filler cap.
7. Check engine oil level.

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ENGINE OIL REPLACEMENT <4G1>

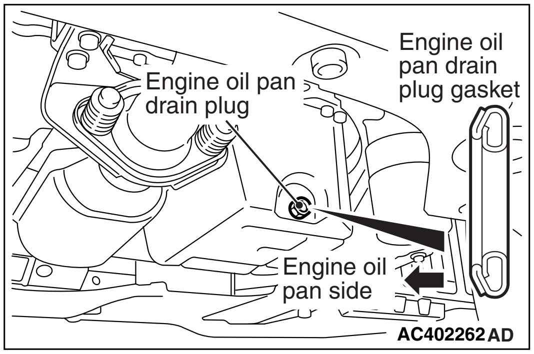
M1121001001174

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C to 90°C.

⚠ ***WARNING***

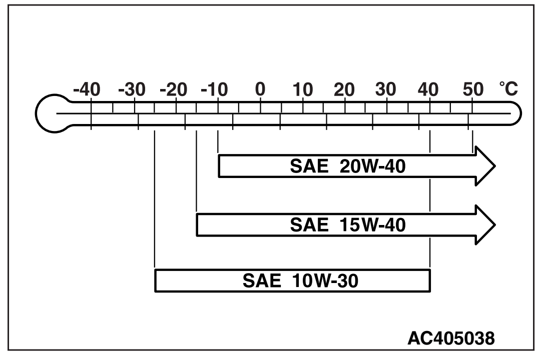
Use care as oil could be hot.

2. Remove the engine oil filler cap.
3. Remove the drain plug to drain oil.



4. Install a new drain plug gasket so that it faces in the direction shown in the illustration, and then tighten the drain plug to the specified torque.

Tightening torque: 39 ± 5 N·m



5. Refill with specified quantity of engine oil.

Specified engine oil (ACEA classification): A1/B1, A3/B3, A3/B4 or A5/B5
Specified engine oil (API classification): SG or higher
Total quantity (Includes volume inside oil filter and oil cooler): 3.7 L

NOTE: Use of additives is not recommended since they may reduce the effectiveness of additives already included in the engine oil. It may result in failure of the mechanical assembly.

NOTE: SAE 5W-30 engine oil can be used to improve engine startability in very cold weather areas where the lowest atmospheric temperature is below the range shown above. In this case, use engine oil conforming to the following classification: ACEA A3/B3, A3/B4 or A5/B5 and API SG or higher.

6. Install the engine oil filler cap.
7. Check oil level.

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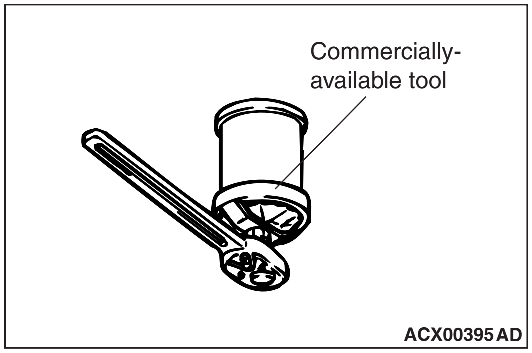
ENGINE OIL FILTER REPLACEMENT

M1121001100811

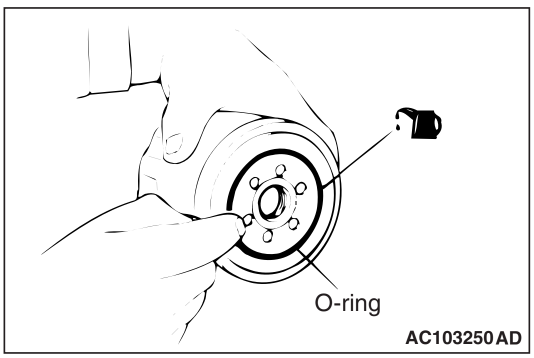
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.

⚠ *WARNING*
Use care as oil could be hot.

2. Remove the engine oil filler cap.
3. Remove the drain plug to drain oil.



4. Use the commercially-available tool to remove the engine oil filter.
5. Clean the filter bracket side mounting surface.



6. Apply a small amount of engine oil to the O-ring of the new oil filter.
7. Where the oil filter O-ring touches the oil pan flange, tighten the oil filter to the specified torque using the commercially-available tool.

Engine	Number	Tightening torque
4A9	MR984204	Approximately 3/4 turn (11 ± 1 N·m)
4G1	MD136466, MD322508	Approximately 3/4 turn (17 ± 3 N·m)
	MD356000	Approximately 3/4 turn (14 ± 2 N·m)

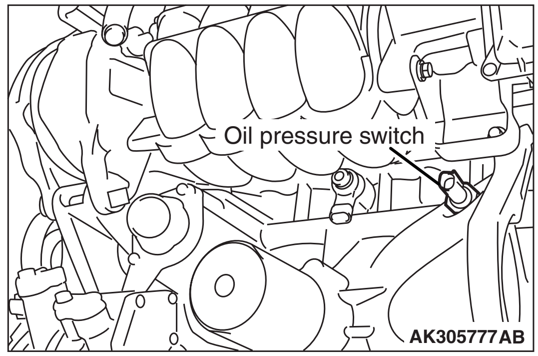
8. Install the drain plug and refill the engine oil [Refer to P.12-3<4A9>, P.12-4<4G1>].
9. Rev the engine a few times, and check to be sure that no engine oil leaks from the installation section of the oil filter.

OIL PRESSURE CHECK

M1121002300982

1. Check engine oil quantity.

⚠ CAUTION
Since sealant is applied to the thread of oil pressure switch, take care not to damage the oil pressure switch when removing it.



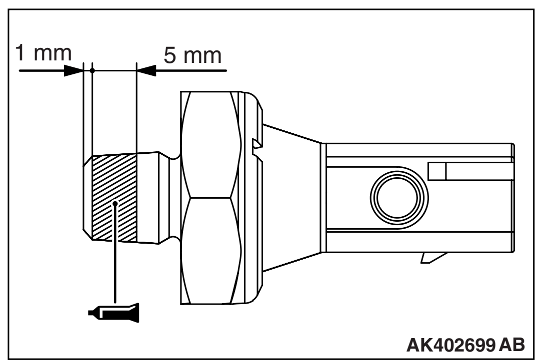
2. Remove the oil pressure switch.
3. Install the oil pressure gauge.

   NOTE: Use an adapter of PT 1/8 thread.

4. Run the engine to warm it.
5. After the engine has been warmed up, check that oil pressure is within the standard value.

   Standard value:
   At idle: 29 kPa or more
   At 3,500 r/min: 294 – 686 kPa

6. Remove the oil pressure gauge.



7. Apply the specified sealant to the thread of oil pressure switch.

   Specified sealant:
   LOCTITE 565 or equivalent

⚠ CAUTION
Do not start the engine within one hour after the oil pressure switch has been installed.

8. Tighten the oil pressure switch to the specified torque.

   Tightening torque: 10 ± 2 N·m

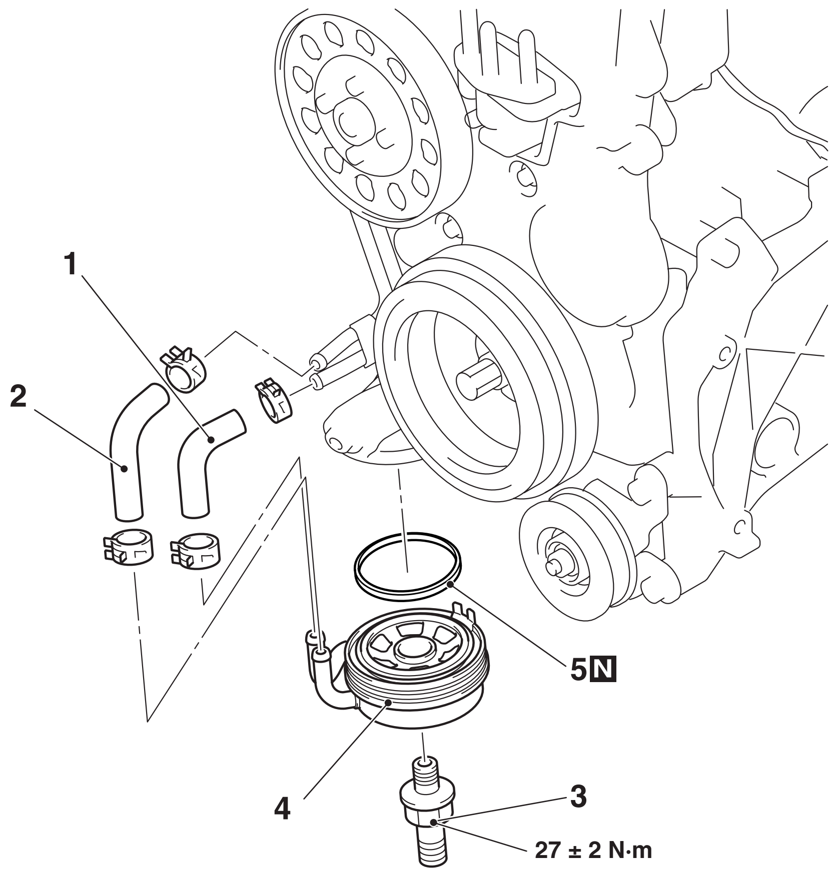
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ENGINE OIL COOLER

REMOVAL AND INSTALLATION <4G1>

M1121001300310

Pre-removal Operation	Post-installation Operation
• Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service − Engine Coolant Replacement P.14-6). • Oil Filter Removal (Refer to P.12-5).	• Oil Filter Installation (Refer to P.12-5). • Engine Coolant Refilling (Refer to GROUP 14, On-vehicle Service − Engine Coolant Replacement P.14-6). • Engine Oil Refilling (Refer to P.12-4).



AC402354AC

Removal steps

1. Engine oil cooler water feed hose connection
2. Engine oil cooler water return hose connection

Removal steps (Continued)

3. Engine oil cooler bolt

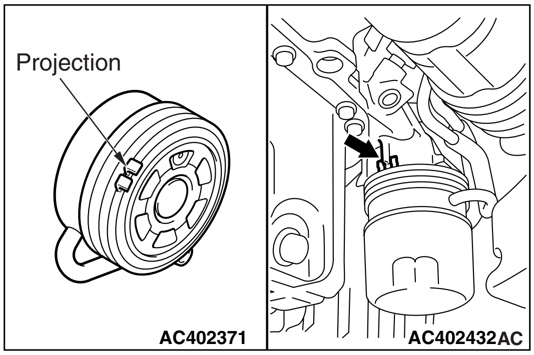
>>**A**<< 4. Engine oil cooler

5. Gasket

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INSTALLATION SERVICE POINT

>>A<< ENGINE OIL COOLER INSTALLATION



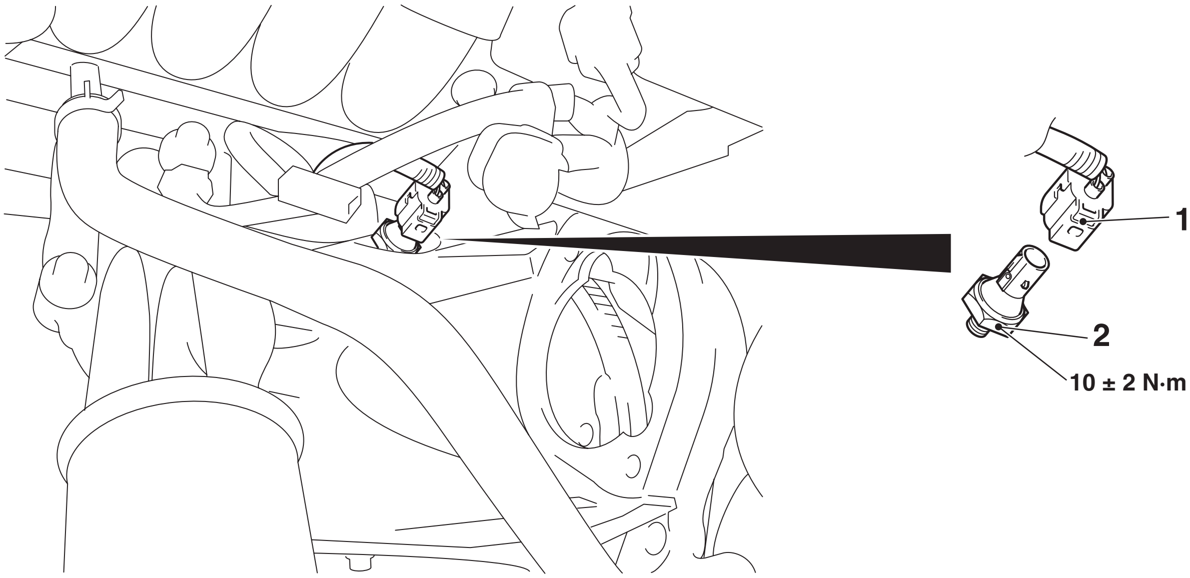
Align the projection on the oil pump case (arrowed part) that prevents the turning of the engine oil cooler with the projection on the engine oil cooler, and install the engine oil cooler.

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OIL PRESSURE SWITCH

REMOVAL AND INSTALLATION <4A9>

M1121002500083



AC402762 AC

Removal steps

- Inlet manifold stay <M/T> (Refer to GROUP 15, Inlet Manifold P.15-11).
- Starter assembly <CVT> (Refer to GROUP 16, Starting System – Starter Motor Assembly P.16-22).
- EGR stay <CVT> (Refer to GROUP 17, Emission Control – EGR Valve P.17-22).

1. Oil pressure switch connector

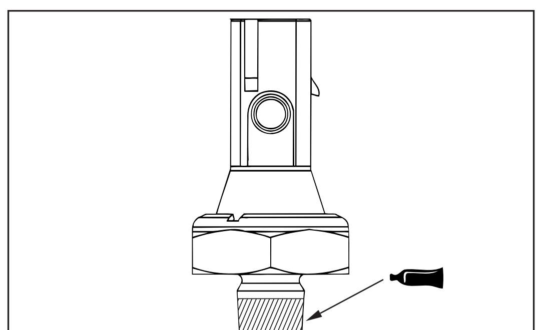
>>**A**<< 2. Oil pressure switch

INSTALLATION SERVICE POINT

>>A<< OIL PRESSURE SWITCH INSTALLATION

⚠ CAUTION

Do not start the engine within one hour after the oil pressure switch has been installed.



AC404265AC

1. Apply the specified sealant to the thread of oil pressure switch.

   Specified sealant: LOCTITE 565 or equivalent

2. Tighten the oil pressure switch to the specified torque.

   Tightening torque: 10 ± 2 N·m